german
cooperation
DEUTSCHE ZUSAMMENARBEIT

Implemented by
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Boden. Grund zum Leben.

SOIL. SUSTAINS LIFE.

WITHOUT HEALTHY SOILS ...

NO FOOD FOR HUMANS, NO FEED FOR ANIMALS.

Worldwide, more than 90 % of our food is produced on and in soils, be it directly or indirectly, given that the production of livestock-based foods requires pastureland as well as cropland for the production of feedstuffs.

LESS CLEAN WATER.

Soils filter infiltrating precipitation.

NO PLANTS.

Soils contain the nutrients required for plant growth. Countless tiny pores allow for plant root respiration and also store water, enabling plants to photosynthesise, a process during which carbon dioxide (CO_2) is converted into oxygen.

MORE SEVERE IMPACTS OF CLIMATE CHANGE.

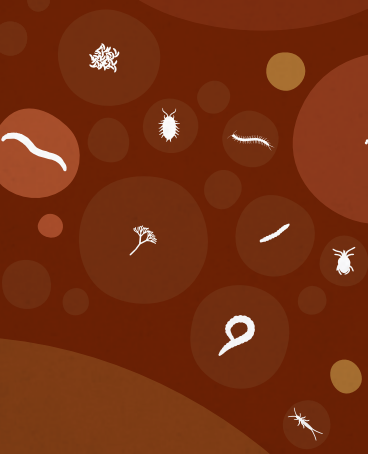
Intact soils can mitigate adverse impacts of climate change, such as droughts or heavy downpours. Soils are the second largest carbon store on our planet after oceans. Worldwide more than 3,000,000,000,000 tonnes of carbon (C) are stored in soils. However, certain farming practices such as ploughing or excessive use of chemical fertilisers result in CO_2 being released into the atmosphere, thus accelerating climate change.

NO HUMANS.

“REAL SOIL IS ACTIVE, ALIVE, MOVING.”

Dr Elaine Ingham
US soil biology researcher and founder of Soil Foodweb Inc.

“Plants, animals, fungi and microorganisms purify the water and air, and ensure fertile soils. The intact ability of the soils and waters to perform self-purification is therefore crucial for the abstraction of drinking water. The natural fertility of the soil ensures a supply of wholesome food. These are not mechanical processes, but instead form part of a complex structure of ecological interactions. Ecosystems have a high absorption capacity and ability to regenerate, but they too have their limitations.”
A quote from Germany’s 2007 National Strategy on Biological Diversity



In a single **TEASPOON OF SOIL** we can find

1 MILLION BACTERIA, 120,000 FUNGI AND 25,000 ALGAE

amongst other microscopically small organisms. So a significantly greater number of organisms live in the soil than on it.

BACTERIA
FUNGI
ALGAE
NEMATODES
SPRINGTAILS
MITES
POTWORMS
MYRIAPODS
DIPTERAN LARVAE
EARTHWORMS
SPIDERS
WOODLICE

A MULTITUDE OF SOILS.

Anyone who thinks that one soil is the same as another is mistaken. Soil classification systems differentiate a large number of major soil types and an even greater number of distinguishing characteristics. According to the European Environment Agency approximately **320 DIFFERENT MAJOR SOIL TYPES** have been identified **IN EUROPE**. Their genesis is influenced by the underlying rock, the climate, time, flora, fauna and human management.

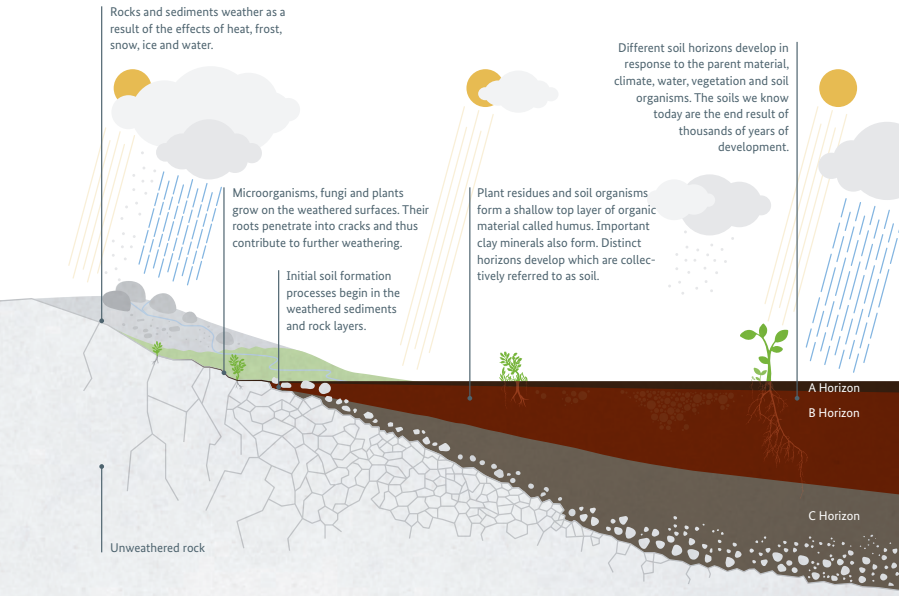
A TIMELINE OF SOIL FORMATION

11,500 BP
in Central Europe

8,000 BP
Climatic Optimum (warmest period of the Holocene)

600–200 BP
“Little Ice Age”

Today



SOIL TAKES TIME.

Soil is not a given. By no means has it existed forever, but rather it has developed over a long period of time. **IN EUROPE IT TAKES ABOUT 2,000 YEARS TO BUILD UP 10 CM OF FERTILE SOIL**. For us humans, this means that soil is a limited and, within human timeframes, non-renewable resource.

Soil is a species-rich, ever-changing ecosystem. External impacts – such as climatic changes, but in particular human-induced impacts – do not leave soils unaffected. Only a living, healthy soil can perform its multitude of functions. This is true for all soil types. If the external impacts are too severe, soils are at risk of degradation: mineral and nutrient contents decline, as does the amount of air and water the soil can hold. Slowly but surely, the soil loses its functional capacity.

“...WITHOUT PROPER CARE FOR IT WE CAN HAVE NO LIFE.”

Wendell Berry

Wendell Berry, US essayist, poet, novelist, environmental activist, cultural critic, and farmer

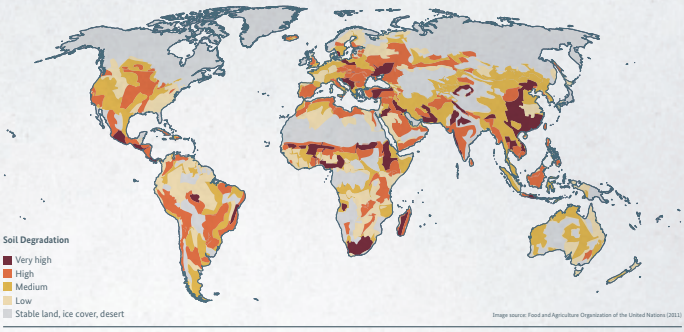


Image source: Food and Agriculture Organization of the United Nations (2011)

Soils are degraded in many of the world’s regions. Thousands of hectares of fertile soil are irretrievably lost every year as a result of unsustainable land use. Where human land use is not site-appropriate, wind and water can erode the uppermost, fertile soil layer. Mismanaged soils lose valuable humus. Wind, precipitation and periods of extreme heat often amplify human-induced soil degradation.

Inappropriate irrigation and intensive use of mineral fertilisers in hot regions can lead to soil salinisation.

Industrial, high input farming using heavy machinery results in soil compaction, while pesticide, herbicide and fertiliser applications lead to water pollution for example with nitrogen and phosphorus.

In regions with small-scale farming structures, especially in developing countries, soils are often under great pressure, as they are heavily utilised, but biomass and mineral fertilisers are not available in sufficient quantities. This may result in soils being depleted and nutrients lost.

Industry, transport routes and settlements contribute to soil degradation as they seal or compact soils. Pollutants and poor waste management contaminate and poison soils.

ETHIOPIA

SUSTAINABLE LAND MANAGEMENT

Project term: 2009 to 2017
Objective: Productive land use as a result of sustainable management, increased yields and improved food security

THE PROBLEM: Farming is the most important economic activity in Ethiopia. But a growing population, increasing desertification and the effects of climate change are making productive land use ever more difficult, especially in the highlands which are affected by erosion and soil degradation. Farming in Ethiopia is mainly rain-fed, i.e. without additional irrigation, as farmers lack facilities for storing seasonal rainfall. In order to increase yields, farmers extend cultivation onto soils of low fertility, which further increases erosion and degradation.

THE SOLUTION: Within this context, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH has been commissioned by the German Federal Government to support the national Sustainable Land Management Programme for the Ethiopian highlands. The aim is to bring degraded soils back into production with the aid of large-scale filling of erosion gullies, the establishment of terraces and cover-cropping thereon, and slope stabilisation. Funding from GIZ, KfW Development Bank and other donors is also being channelled into communal infrastructure, in part to solve the irrigation problem. To ensure that soils are permanently well maintained, the Ethiopian Ministry of Agriculture advises small farmers on sustainable farming methods. In this manner approximately 180,000 hectares of degraded land have been returned to productive use, benefiting about 194,000 households.

SAHEL

PREVENTING DESERTIFICATION

Various projects:
since 2000
Objective: Preventing desertification and providing new livelihoods for local people

THE PROBLEM: Since the 1960s, improper land use and ongoing population growth have resulted in life-threatening loss of soil resources in the Sahel region. Climatic changes including years of drought followed by torrential downpours have contributed to serious land degradation. The damaged sites cannot absorb rains fast enough. As a result, the precious soil is regularly washed away in flood events.

THE SOLUTION: Soil conservation and soil rehabilitation are at the heart of the Sahel projects as part of German development cooperation. One of the methods used is erosion control in water catchment areas. Barriers are constructed to slow the rainwater flowing down from hillsides; these include rock and earth berms of varying lengths, heights and shapes. Trees, grasses and other plants on top of and alongside these barriers form a protective layer of vegetation, combating wind erosion. These berms allow water to infiltrate into the soil, raising the groundwater level and allowing for soil cultivation – once again or even for the first time. Over the years, formerly desertified lands re-green and provide new livelihoods for the local people. In this manner, 9,000 hectares of arable land have already been returned to productive use in Burkina Faso, Niger and Chad.